

WHAT IS CLAIMED IS:

- 1 1. A game machine, comprising:
  - 2 a traveling field, on which platen dots are provided; and
  - 3 a plurality of self-propelled members, which are provided on the
  - 4 traveling field, each including:
    - 5 a first yoke, which constitutes a first linear motor together
    - 6 with the platen dots for propelling the self-propelled member in a first direction
    - 7 on the traveling field;
    - 8 a second yoke, which constitutes a second linear motor
    - 9 together with the platen dots for propelling the self-propelled member in a
    - 10 second direction which is perpendicular to the first direction;
    - 11 a motor;
    - 12 a miniature member, which is coupled with the motor so as
    - 13 to be rotatably supported on the self-propelled member; and
    - 14 a controller, which controls the motor such that a rotated
    - 15 angle of the miniature member is determined in accordance with a propelling
    - 16 direction of the self-propelled member.
- 1 2. The game machine as set forth in claim 1, wherein ball bearings are
- 2 provided on a bottom face of the self-propelled member to assist the propelling
- 3 on the traveling field.
- 1 3. The game machine as set forth in claim 1, wherein each of the first
- 2 yoke and the second yoke is formed with three legs provided with coils, to

3 constitute three-phase linear motor.

1 4. The game machine as set forth in claim 3, wherein a lower end  
2 portion of each leg is split into plural projections each having an identical width  
3 with a width of each platen dot.

1 5. The game machine as set forth in claim 2, wherein the ball bearings  
2 are composed of at least three independent ball bearings.

1 6. The game machine as set forth in claim 2, wherein the ball bearings  
2 are supported within an annular retainer formed on the bottom face of the  
3 self-propelled member to constitute a thrust bearing.

1 7. The game machine as set forth in claim 1, wherein the motor is a  
2 pulse motor.

1 8. The game machine as set forth in claim 1, wherein nozzles from  
2 which air is blown toward a bottom face of the self-propelled member are  
3 formed on the traveling field to form an air bearing layer between the bottom  
4 face and the traveling field to support the self-propelled member thereon.

1 9. The game machine as set forth in claim 8, wherein a skirt member is  
2 formed on a peripheral portion of the bottom face of the self-propelled member.

1 10. The game machine as set forth in claim 1, wherein the self-propelled  
2 member includes a compressor for blowing compressed air toward the  
3 traveling field through nozzles formed on a bottom face thereof, to form an air  
4 bearing layer between the bottom face and the traveling field to support the  
5 self-propelled member thereon.

1 11. A self-propelled member which propels on a traveling field provided  
2 with platen dots thereon, comprising:

3 a first yoke, which constitutes a first linear motor together with the  
4 platen dots for propelling the self-propelled member in a first direction on the  
5 traveling field;

6 a second yoke, which constitutes a second linear motor together with  
7 the platen dots for propelling the self-propelled member in a second direction  
8 which is perpendicular to the first direction;

9 a motor;

10 a miniature member, which is coupled with the motor so as to be  
11 rotatably supported on the self-propelled member; and

12 a controller, which controls the motor such that a rotated angle of the  
13 miniature member is determined in accordance with a propelling direction of  
14 the self-propelled member.

1 12. The self-propelled member as set forth in claim 11, wherein ball  
2 bearings are provided on a bottom face of the self-propelled member to assist  
3 the propelling on the traveling field.

1       13.     The self-propelled member as set forth in claim 11, wherein each of  
2       the first yoke and the second yoke is formed with three legs provided with coils,  
3       to constitute three-phase linear motor.

1       14.     The self-propelled member as set forth in claim 13, wherein a lower  
2       end portion of each leg is split into plural projections each having an identical  
3       width with a width of each platen dot.

1       15.     The self-propelled member as set forth in claim 12, wherein the ball  
2       bearings are composed of at least three independent ball bearings.

1       16.     The self-propelled member as set forth in claim 12, wherein the ball  
2       bearings are supported within an annular retainer formed on the bottom face of  
3       the self-propelled member to constitute a thrust bearing.

1       17.     The self-propelled member as set forth in claim 11, wherein the motor  
2       is a pulse motor.

1       18.     The self-propelled member as set forth in claim 11, wherein a skirt  
2       member is formed on a peripheral portion of a bottom face of the self-propelled  
3       member.

1       19.     The self-propelled member as set forth in claim 11, wherein the  
2       self-propelled member includes a compressor for blowing compressed air  
3       toward the traveling field through nozzles formed on a bottom face thereof, to

4 form an air bearing layer between the bottom face and the traveling field to  
5 support the self-propelled member thereon.

1 20. A racing game machine, comprising:  
2 a racing track;  
3 a traveling field extending below the racing track, on which platen  
4 dots are provided;  
5 a plurality of miniature members, which are provided on the racing  
6 track to be raced with each other, each miniature member provided with a  
7 magnetic substance; and  
8 a plurality of self-propelled members, which are provided on the  
9 traveling field while being associated with the respective miniature members,  
10 each self-propelled member including:  
11 a first yoke, which constitutes a first linear motor together  
12 with the platen dots for propelling the self-propelled member in a first direction  
13 on the traveling field;  
14 a second yoke, which constitutes a second linear motor  
15 together with the platen dots for propelling the self-propelled member in a  
16 second direction which is perpendicular to the first direction;  
17 a guide magnet, which constitutes a torque transmission  
18 coupling with the magnetic substance of the associated miniature member;  
19 a motor, which rotates the guide magnet so as to turn a  
20 posture of the associated miniature member via a magnetic force; and  
21 a controller, which controls the motor such that a rotated  
22 angle of the guide magnet is determined in accordance with a propelling

23 direction of the self-propelled member.

1 21. The game machine as set forth in claim 20, wherein ball bearings are  
2 provided on a bottom face of the self-propelled member to assist the propelling  
3 on the traveling field.

1 22. The game machine as set forth in claim 20, wherein each of the first  
2 yoke and the second yoke is formed with three legs provided with coils, to  
3 constitute three-phase linear motors.

1 23. The game machine as set forth in claim 22, wherein a lower end  
2 portion of each leg is split into plural projections each having an identical width  
3 with a width of each platen dot.

1 24. The game machine as set forth in claim 21, wherein the ball bearings  
2 are composed of at least three independent ball bearings.

1 25. The game machine as set forth in claim 21, wherein the ball bearings  
2 are supported within an annular retainer formed on the bottom face of the  
3 self-propelled member to constitute a thrust bearing.

1 26. The game machine as set forth in claim 20, wherein each of the guide  
2 magnet of the self-propelled member and the magnetic substance of the  
3 miniature member is composed of arcuate N-pole magnets and arcuate S-pole  
4 magnets which are arranged alternately and annularly.

1       27.     The game machine as set forth in claim 20, wherein the motor is a  
2     pulse motor.

1       28.     The game machine as set forth in claim 20, wherein nozzles from  
2     which air is blown toward a bottom face of the self-propelled member are  
3     formed on the traveling field to form an air bearing layer between the bottom  
4     face and the traveling field to support the self-propelled member thereon.

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1       29.     The game machine as set forth in claim 28, wherein a skirt member is  
2     formed on a peripheral portion of the bottom face of the self-propelled member.

1       30.     The game machine as set forth in claim 20, wherein the self-propelled  
2     member includes a compressor for blowing compressed air toward the  
3     traveling field through nozzles formed on a bottom face thereof, to form an air  
4     bearing layer between the bottom face and the traveling field to support the  
5     self-propelled member thereon.

1       31.     The game machine as set forth in claim 20, wherein the magnetic  
2     substance of the miniature member is divided magnetic poles forming an  
3     induced magnet.

1       32.     The game machine as set forth in claim 21, wherein:  
2             the ball bearings are made of metal, and  
3             a conductive layer is formed on the traveling field for supplying

4       electric power to the linear motors of the self-propelled member via the ball  
5       bearings.

1       33.       A self-propelled member which propels on a traveling field provided  
2       with platen dots thereon, comprising:

3               a miniature member, which is provided with a magnetic substance;  
4               a first yoke, which constitutes a first linear motor together with the  
5       platen dots for propelling the self-propelled member in a first direction on the  
6       traveling field;

7               a second yoke, which constitutes a second linear motor together with  
8       the platen dots for propelling the self-propelled member in a second direction  
9       which is perpendicular to the first direction;

10              a guide magnet, which constitutes a torque transmission coupling with  
11       the magnetic substance of the miniature member;

12              a motor, which rotates the guide magnet so as to turn a posture of the  
13       miniature member via a magnetic force; and

14              a controller, which controls the motor such that a rotated angle of the  
15       guide magnet is determined in accordance with a propelling direction of the  
16       self-propelled member.

1       34.       The self-propelled member as set forth in claim 33, wherein ball  
2       bearings are provided on a bottom face of the self-propelled member to assist  
3       the propelling on the traveling field.

1 35. The self-propelled member as set forth in claim 33, wherein each of  
2 the first yoke and the second yoke is formed with three legs provided with coils,  
3 to constitute three-phase linear motors.

1 36. The self-propelled member as set forth in claim 35, wherein a lower  
2 end portion of each leg is split into plural projections each having an identical  
3 width with a width of each platen dot.

1 37. The self-propelled member as set forth in claim 34, wherein the ball  
2 bearings are composed of at least three independent ball bearings.

1 38. The self-propelled member as set forth in claim 34, wherein the ball  
2 bearings are supported within an annular retainer formed on the bottom face of  
3 the self-propelled member to constitute a thrust bearing.

1 39. The self-propelled member as set forth in claim 33, wherein each of  
2 the guide magnet of the self-propelled member and the magnetic substance of  
3 the miniature member is composed of arcuate N-pole magnets and arcuate  
4 S-pole magnets which are arranged alternately and annularly.

1 40. The self-propelled member as set forth in claim 33, wherein the motor  
2 is a pulse motor.

1 41. The self-propelled member as set forth in claim 33, wherein a skirt  
2 member is formed on a peripheral portion of a bottom face of the self-propelled

3 member.

1 42. The self-propelled member as set forth in claim 33, wherein the  
2 self-propelled member includes a compressor for blowing compressed air  
3 toward the traveling field through nozzles formed on a bottom face thereof, to  
4 form an air bearing layer between the bottom face and the traveling field to  
5 support the self-propelled member thereon.

1 43. The game machine as set forth in claim 33, wherein the magnetic  
2 substance of the miniature member is divided magnetic poles forming an  
3 induced magnet.

1 44. The game machine as set forth in claim 34, wherein the ball bearings  
2 are made of metal, through which electric power is supplied to the linear  
3 motors.